



Galvanised steel building framework

Most kids have put zinc cream on their noses at one time or another to protect their skin from a bad sunburn. But did you know that zinc is called 'The Great Protector' for another reason?

Zinc protects iron and steel from corrosion, very important when you think that almost all our buildings, railways, lighting pylons, cars, and bridges contain steel. Without zinc, we would live in a very rusty world!

We would also have to do without lots of products we take for granted.

PROPERTIES

- Pure zinc is a bluish-white, shiny metal.
- Zinc is resistant to corrosion.
- Zinc has a relatively low melting point (420°C).
- Zinc has never been found naturally in its pure form.
- Zinc can be alloyed (mixed) with a number of other metals.
- Zinc is brittle at ordinary temperatures but is malleable and ductile (can be beaten and drawn into a wire) when heated to 100⁰ C.
- Zinc is a good electrical conductor.
- Zinc has the symbol Zn.
- Zinc is fairly hard.

USES

USE	DESCRIPTION
Galvanising	In Australia today, two-thirds of all the zinc used is to protect steel from rusting. Steel is coated by galvanising (a process named after Italian chemist, Luigi Galvani, who invented it). The steel is dipped in molten zinc, often also with aluminium. Products include steel beams, roofs, poles, wires, nails, household appliances and car bodies.
Diecast objects	Zinc mixed with small amounts of aluminium produces a very strong alloy. Its low melting point enables it to be diecast (cast into different shapes in steel moulds) to make all sorts of items (some requiring fine detail) from carburettors to doorhandles, staples to zips, even matchbox cars!
Brass	Brass (70% copper, 30% zinc) is particularly rust-resistant and so is used to make the hulls of sailing boats and other marine hardware. Many musical instruments are made from brass. Also decorative pieces, from light fittings to taps, as well as instruments for astronomy, surveying, navigation and other scientific purposes.
Batteries	When alloyed with other metals, zinc becomes a good electrical conductor. Zinc-bromide and zinc-nickel power cells are amongst the newest types of batteries.
Health	Humans and other animals need to ingest zinc for proper growth and healing of wounds to occur. Fruits, nuts, meat, oysters and other shellfish are good sources of zinc.
Zinc oxide	Zinc oxide is a unique and very useful material, used in the manufacture of rubber tyres, skin products (such as zinc cream, anti-dandruff shampoos, antiseptic ointments, and calamine lotion for healing skin disorders), paints, floor coverings, plastics (to help prevent them cracking) and ceramic glazes.
Zinc sulphide	In luminous dials on watches, TV screens and fluorescent lights.
Other zinc compounds	As a dissolving agent, to help prevent plastics from cracking, in surgical dressings, glues, and to preserve and fire-proof timber.



Zinc cream on faces

SOURCE

The ores of zinc usually occur together with other ores. The discovery of a large zinc-lead-silver orebody at Broken Hill in 1883 (a mine is still in operation today) was a significant event in Australia's history as it greatly boosted our economy. Previously we had relied only on wool and wheat for the nation's wealth.

However, until the early 1900s much of the mined zinc was wasted, as it could not efficiently be separated from the other ores and waste rock. Then a Broken Hill mill foreman, James Lyster discovered that crushing the rock, adding water and oil and then bubbling air through the mixture, caused the zinc to stick to the bubbles. The zinc floated to the surface where it could be skimmed off. The waste rock material sank to the bottom. This was the invention of the revolutionary 'froth flotation' method of separating minerals, now used world-wide!

Most zinc mines are underground operations. The zinc ore is blasted, scooped up by front-end loaders, taken in large trucks to underground crushers, then hoisted to the surface up one of the shafts. At the surface, the ore is crushed further and subjected to the froth flotation method, then heated and treated in other ways to purify the zinc and separate it from any other metals.

Australia today has more than 20% of the world's known zinc-lead resources. It is the largest producer and exporter of these metals to the rest of the world. Our main zinc mines are at McArthur River in the Northern Territory and Cannington in Queensland. The Century zinc mine, also in Queensland, will be the world's largest zinc mine when it reaches full production, and Australia's only large open-pit zinc mine.



Location of Australia's major Silver-Lead-Zinc Mines

AMAZING FACTS

- The Romans and Chinese smelted zinc ores such as calamine (zinc carbonate) with copper to produce brass, using it for coins, containers, armour and jewellery. They did not realise zinc was a metal. The Romans also used calamine to heal wounds.
- Pure zinc was probably first produced in India and China in the 13th or 14th century.
- By the 18th century, the Europeans were producing zinc on a large scale.
- Smelting of zinc-lead ores produces large amounts of sulphur dioxide gas, but fortunately it is turned into sulphuric acid and used to produce fertilisers.
- About 30% of zinc used in the Western World comes from recycled materials.
- Australia uses more zinc-coated steel (like Colorbond or Zinalume) per person than any other country.
- Zinc dust is very flammable when dry so it is used in fireworks.

FOR FURTHER INFORMATION

- Fact Sheet: Zinc, Minerals Council of Australia and Australian Geological Survey Organization, 1999
- ITAM Lead/Zinc, Minerals Council of Australia, 1996
- www.agso.gov.au/education/factsheet/